maxon EC EUROPE

SD125E
User Manual

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English

Safety Information

WARNING

- **NEVER** connect the transceiver to an AC outlet. This may pose a fire hazard or result in an electric shock.
- **NEVER** operate the radio transmitter without a suitable artificial load or antenna connected
- **DO NOT** allows children to operate transmitter-equipped radio equipment.

CAUTION

- **DO NOT** operates the transceiver near unshielded electrical blasting caps or in an explosive atmosphere unless it is a type especially designed and qualified for such use.
- **NEVER** modify a transceiver or accessory except as instructed in the service manual, engineering bulletins or formal communication as this may invalidate any warranty, guarantee or type approval.
- **NEVER** use the transceiver in an aircraft.
- **NEVER** use the transceiver near to sensitive medical equipment or in areas where instructed not to do so, e.g. Petrol filling stations.
- **NEVER** mount the transceiver unit on or near the Airbag or Airbag activation device.
- **NEVER** use an accessory not recommended or supplied by Maxon may cause damage to equipment or injury to personnel, and will invalidate warranty.
- **DO NOT** use or place the transceiver in areas with temperatures below -30°C or above +60°C, In areas subject to direct sunlight, such as the dashboard.
- **AVOID** placing the transceiver in excessively dusty environments.
- **DO NOT** fit the transceiver in such a manner that the antenna is next to, or touching, exposed parts of the body, especially the face or eyes, while transmitting.
- **ALWAYS** Install the SD125E using a suitable heat sinking surface.
- **NEVER** operate the radio transmitter without a suitable artificial load or antenna connected.
- **ALWAYS** Secure locking nuts on DB09 connector and always disconnect power supply before removing D-type connector.

For service or repair always return your radio to an authorised Maxon Dealer or warranty conditions will be invalid.

English

Table of Contents

Safety Information 2
Table of Contents 3
About your SD125E Series data radio 4
About Your SD125E Radio 4
General SD125E Specification 5
SD125E Transmitter Specification 6
SD125E Receiver Specification 7
Unpacking Information 8
SD125E Features 8
Description of Radio Components 9
SD125E Series Operation 10
Pin-outs DB-09 Connector 10
Channel Selection 11
Features 12
Serial Command 13
Audible alert tones 14
Accessories available 14

English

About your SD125E Series data radio

About Your SD125E Radio

The MaxonCIC SD-125E Series of RF Link Modules from MaxonCIC utilizes the latest technology in its design and manufacturing. Both the UHF and VHF models are PLL (Phase Lock Loop Synthesizer) /microprocessor controlled, and offer one to five watts of power with 16 channel capability. Multiple functions including 1200 to 2400 baud rates, AC and/or DC audio coupling, FFSK and FSK modulation are standard in these fully programmable wide bandwidth RF Link Module units.

The SD125E RF link module is a new and improved version of the popular SD125. With new generation components, the module allows RF data communication between two distant points, where a wire connection is not applicable. Some of the possible applications are remote parking meters and barriers, data base transversal, remote control, sign and camera control and telemetry.

The SD125E has a 9 pin D-type interface connector with 16 programmable channels selectable via dip switch. The RF output power is 1 – 5 Watts giving superior range. The SD125E programmer is Windows XP compatible and can be use with the older model SD125. With compact size, cast Aluminum housing and multi voltage DC connection capability the SD125E gives robustness and flexibility needed in remote and modern sites.

The radios are programmed using ACC 900E programming software, an Intel Pentium2 or higher Personal Computer, Operating system is Microsoft windows 98, ME, 2000, and XP and Vista based software, an interface module and a programming cable. This allows the radio to be tailored to meet the requirements of the individual user and of the System(s) it is operating within.

To assure satisfaction from the radio, we urge you to thoroughly read the operation and function information in this manual before operating your SD-125E U2/V2.

Applications of some of the functions described in this manual are determined by the system you use. Your dealer will program your radio so that you have the greatest number of functions possible relative to your needs.

Should you have questions regarding the operation of the radio, please consult your Dealer.

Antenna / RF connector	BNC type nominal 50Ω impedance
Programmer ACC 900E	Vista, XP, ME, 2000 and Windows based programmer allowing personalisation of the SD-125E Series Modems via the RS232 port. Requires ACC-2125E Programming cable and Universal programming CD ME430068. Programming lead ACC–2125E
Squelch Calibration	The squelch can be aligned using the ACC-900E TAC-101D calibration lead will be required.

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General SD125E Specification

General specification	VHF	UHF
Equipment Type	Data radio (Wireless Modem)	Data radio (Wireless Modem)
Model Series	SD-125E V2	SD-125E U2
Performance Specifications	TIA/EIA-603 /ETS 300-113	
Frequency Range	146-174MHz	440-470MHz
RF Output	1-5W	1-5W
Channel Spacing	12.5KHz, 25KHz Programmable	
Modulation Type	F3D, F3E	
Intermediate Frequency	45.1MHz & 455KHz	
Number of Channels	16	
Frequency Source	Synthesizer	
Operation Rating	Intermittent 90 : 5 : 5 (Standby : RX : TX)	
External Power Supply	(12 VDC Nominal) (Extreme 9.0V - 15.0 VDC)	
Temperature Range Storage Operating	 From -40°C to +80°C From -30°C to +60°C	
Current Consumption Standby(Muted) Transmit 5Watts RF Power Transmit 2Watts RF Power	 < 65mA < 2.0 A < 1.0 A	
Lock Time :	< 10ms	
TX to RX attack time	< 20ms (No Power Saving)	
RX to TX attack time	< 20ms	
Dimensions	122mm (L) x 62mm (W) x 30mm (D)	
Weight	242 grams	

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SD125E Transmitter Specification

Transmitter specification	VHF	UHF
Model Series	SD-125E V2	SD-125E U2
Carrier Power (Nom. Max. Min.) Hi Power Low Power	 5W < 6W > 4.5W 1W<1.5W>0.8W	 5W < 6W > 4.5W 1W<1.5W>0.8W
Sustained Transmission Time 5 10 30Sec (Nominal Conditions)	Power : >90% >85% >80%	Power : >90% >85% >80%
Frequency Error Nominal condition Extreme condition	 < 0.5 KHz ±5.0 ppm	 < 0.75 KHz ±3.0 ppm
Frequency Deviation 25 KHz Channel Spacing 12.5 KHz Channel Spacing	Peak ±5.0, Min. ±3.8KHz Peak ±2.5, Min. ±1.9KHz	
Audio Frequency Response	Within +1/-3dB of 6dB octave @ 300 Hz to 2.55 kHz for 12.5 kHz C.S. @ 300 Hz to 3.0 kHz for 25 kHz C.S.	
Adjacent Channel Power 25 KHz Channel Spacing 12.5 KHz Channel Spacing	 < 70 dBc @ Nominal Condition < 65 dBc @ Extreme Condition < 60 dBc @ Nominal Condition < 55 dBc @ Extreme Condition	
Conducted Spurious Emission	< -36 dBm	< -36 dBm
Modulation Sensitivity	100mV RMS @ 60% Peak Dev.	
Hum & Noise : 25 KHz Channel Spacing 12.5 KHz Channel Spacing	 > 40 dB (without PSOPH) > 40 dB (with PSOPH)	
Modulation Symmetry	< 10% Peak Dev @ 1KHz input for nominal dev. + 20dB	
Load Stability	No osc at ≥ 10:1 VSWR all phase angles and suitable antenna No destroy at ≥ 20:1 all phase angle	
Peak Deviation Range Adjustment @ 1 KHz, Nom Dev + 20dB 25 KHz Channel Spacing 12.5 KHz Channel Spacing	 Min. 3.5, Max. 6.0KHz Min. 1.5, Max. 4.0KHz	

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SD125E Receiver Specification

Receiver Specification	VHF	UHF
Model Series	SD-125E V2	SD-125E U2
Sensitivity (@ 12dB SINAD) 25 KHz Channel Spacing 12.5 KHz Channel Spacing	 < 0.28uV < 0.30uV	 < 0.28uV < 0.30uV
Sensitivity (1/100 Error Rate) With ACC-513 With ACC-514	 < -113dBm < -110dBm	 < -113dBm < -110dBm
Amplitude Characteristic	> -3dB , < +3dB	> -3dB , < +3dB
Adjacent Channel Selectivity 25 KHz Channel Spacing(Nom.) (Extreme Condition) 12.5 KHz Channel Spacing(Nom.) (Extreme Condition)	 > 70 dB > 60 dB > 60 dB > 50 dB	 > 70 dB > 60 dB > 60 dB > 50 dB
Spurious Rejection(100KHz ~ 4GHz)	> 70 dB	> 70 dB
Image / Half IF Rejection	> 70 dB	> 70 dB
Intermodulation Response Rejection ±25 kHz/ 50 kHz ±50 kHz/ 100 kHz	 > 70 dB > 70 dB	 > 70 dB > 70 dB
Conducted Spurious Emission 9 KHz - 1 GHz 1 GHz – 4 GHz	 < -57 dBm < -47 dBm	 < -57 dBm < -47 dBm
RX Spurious Emissions (Radiated) 9 KHz - 1 GHz 1 GHz – 4 GHz	 < -57 dBm < -47 dBm	 < -57 dBm < -47 dBm
AF Distortion Nominal condition Extreme condition	 < 3% < 10%	 < 3% < 10%
RX Hum & Noise (only audio) 25 KHz Channel Spacing 12.5 KHz Channel Spacing	 < 40 dB without PSOPH < 40 dB with PSOPH	 < 40 dB without PSOPH < 40 dB with PSOPH
Receiver Response Time :	< 16 ms	< 16 ms
Squelch (factory pre-set) Open Close	 -113dBm -116dBm	
Squelch Attack Time RF Level at Threshold RF Level at Threshold + 20dB	 < 20 ms (RSSI), < 40 ms (Analog) < 10 ms (RSSI), < 30 ms (Analog)	
Squelch Decay Time	5 ms Min., 20ms Max.	
Antenna Socket Input Match	> 10 dB Return Loss	
Temperature Stability for L.O. Frequency	1st < 5 ppm, 2nd < 15 ppm from -30° to + 60° C	
L.O. Frequency Aging Rate	±2 ppm/ year	

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Unpacking Information

Remove and carefully inspect the contents of your package(s) for the following items:

1. Radio
2. User Manual

* If any items are missing or damaged please contact your Dealer or Maxon

SD125E Features

Synthesized Operation with 16 channel capability

1 / 5 Watt programmable output power

Programmable 12.5 / 25 KHz channel spacing

Busy channel lockout

16 channel

TX Time-out timer

Power Save

FFSK Modem

FSK Modem

Frequency steps 6.25KHz, 5.00KHz and 2.50KHz

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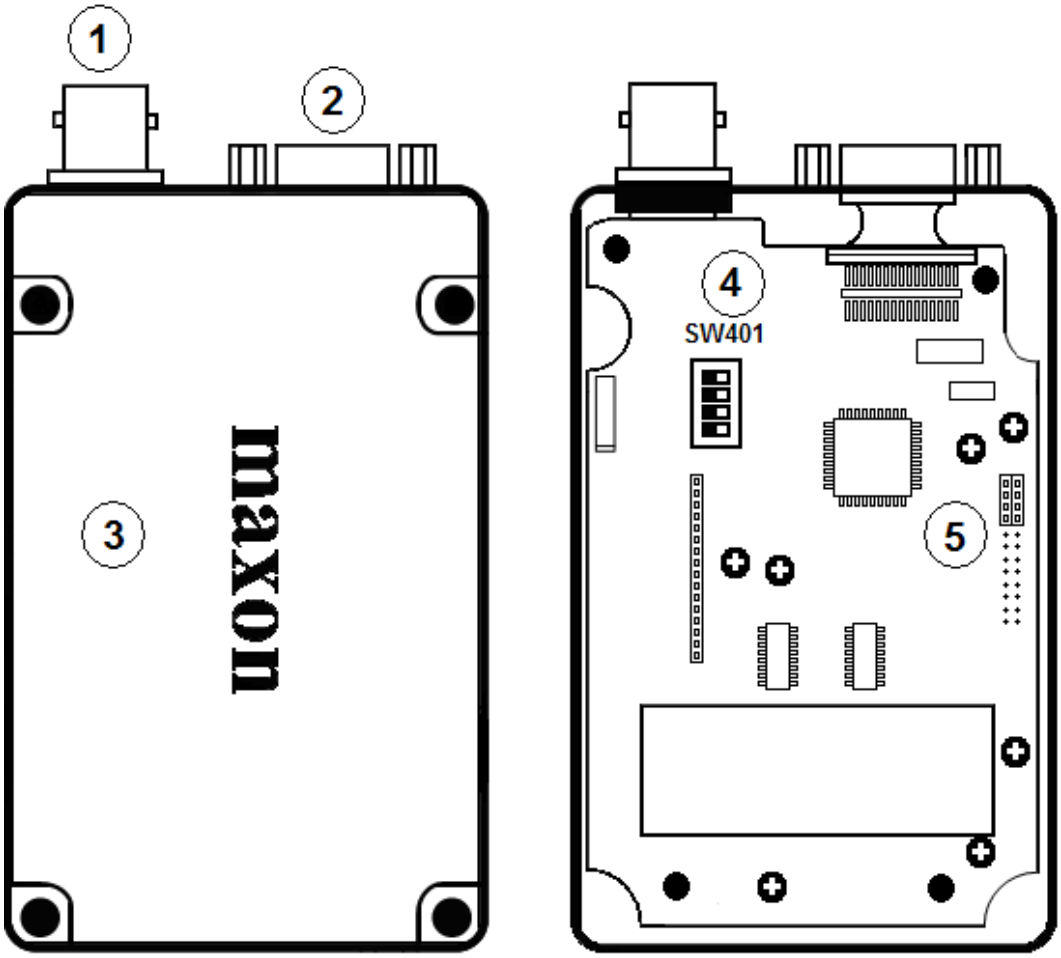
Description of Radio Components

1) Antenna connector
2) DB-09 connector
3) Top cover
4) DIP-S/W channel selector
5) Jumper selector

Exterior View



Antenna installation

Fasten the antenna to the radio by turning the antenna cable clockwise onto the BNC receptacle on left of radio when looking at front of radio.

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SD125E Series Operation

16 Channel select

Your radio's channel can be selected by inner DIP-S/W or serial command inputted from external control system. To change channel by inner DIP-S/W (4), you should open the upper cover and then look for the DIP-S/W (4) on the digital board of the bottom cover. Once located change the DIP-S/W to select wanted channel according to channel dip switch chart (See page 11).

To use a serial command for channel selection, it should be inputted by external equipment or device (ex. Personal computer). See the message format for serial command for full details.

Transmit

The transmission will be made by various inputs such as PTT signal (Pin 3 of DB-15 connector), TTL level is used as PTT signal and is active low. To maintain transmission, continuous PTT signal input is required. When the channel is "clear", input the PTT signal and transmit data. Remove the PTT signal or input Rx serial command when you have finished transmission.

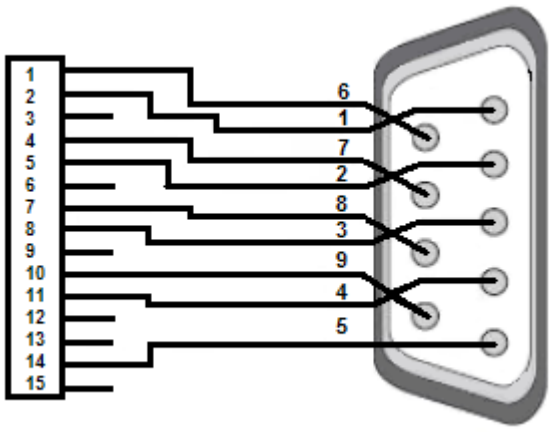
> CAUTION: Operation of the transmitter without a proper antenna installed may result in permanent damage to the radio.

Receive

When you have finished transmission, remove the PTT signal. You will be in the RX mode and can receive data from another radio.

Pin-outs DB-09 Connector

DB9	CON 401
Pin1	Audio In (Data RX) 2
Pin2	Audio Out (Data TX) 5
Pin3	PTT 8
Pin4	GND (Ground) 11
Pin5	B+ (8-18 Volts DC) 14
Pin6	Carrier Detect (Squelch) 1
Pin7	N/C No Connect 4
Pin8	Switch 7
Pin9	N/C No Connect 10



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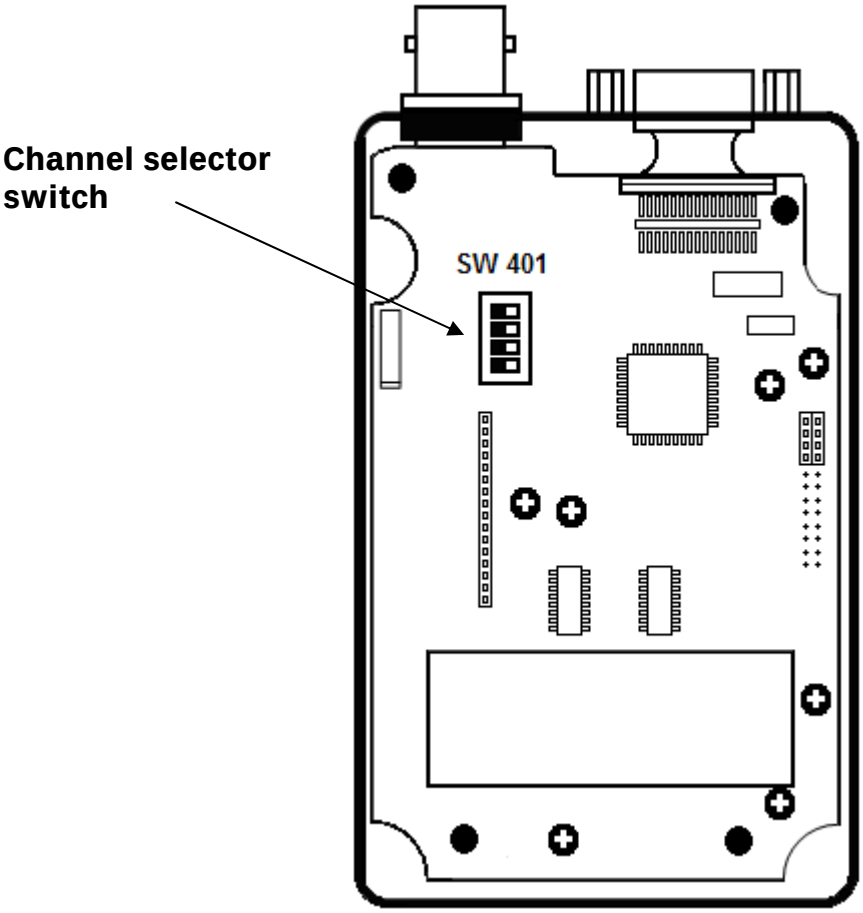
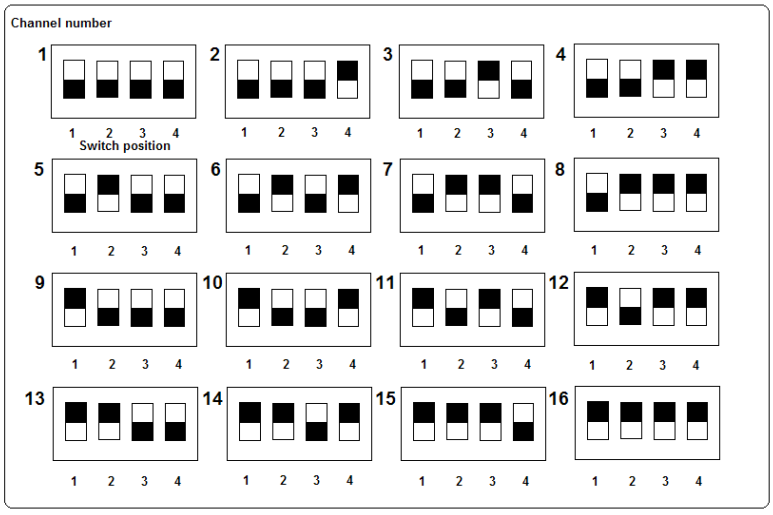
Channel Selection

Setting of channel selector switch for each channel





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Features

Channel Spacing

The SD-125E is capable of programmable channel spacing, in both UHF and VHF bands. Each channel can be programmed via the PC programmer, ACC-900E, having 12.5 KHz or 25 KHz channel spacing.

Output Power

RF Power is programmable in the SD-125E. Each channel can be programmed via the PC programmer to a high-power output, 5 Watts, or low-power output, 1 Watt.

Busy Channel Lockout

Busy Channel Lockout – ON: Upon PTT enable, if carrier is present, the radio will not transmit.

Busy Channel Lockout – OFF: Upon PTT enable, the radio will transmit regardless of the presence of carrier.

TX Time-out timer

This feature, when enabled, limits the amount of time that the user can continuously transmit. This time can be set in increments by 10 seconds from 10 seconds to 120 seconds. If the user attempts to transmit longer than the TX Time-out period, five seconds prior to expiration, the radio will release Time-out alert signal through pin 9 of the DB-15 connector and will cease transmission.

Power Save

The Power Save function (PS) is used when an external battery is used as the power source. When Power Save is enabled, the receiver PS on time can be set in 50 second increments up to 9950 seconds and PS OFF time can be set in 20 second increments up to 160 seconds. A delay time can also be programmed in 1 second increments up to 8 seconds, this is the delay of PS start time after a period of inactivity, programmed and allows the operator to set the length of time the receiver.

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Serial Command

Serial RX/TX Data Format

(1) Asynchronous Serial Data Transfer
(2) Baud Rate : 4,800 bit/sec
(3) Data Bit : 8bit , Non Parity
(4) Stop Bit : 1bit
(5) MSB first transmission

Each serial command consists of 3 bytes.
1_{st} byte is command and 2_{nd} is data required by command and 3_{rd} is check sum to decide validity of total contents.

Byte0

ST	1_{st} Byte (Command)	SP

Byte1

ST	2_{nd} Byte (Data)	SP

Byte2

ST	3^{rd} Byte (Check Sum)	SP

Receive Command & data

Mode	Transmit Command (BYTE0)	Transmit data (BYTE1)	Check sum(BYTE2) : Transmit Command + data
Process Complete Commands	0xaa	ACK	
	0x55	NACK	

Note)
This command is return signal for receiving command.
If Byte2 and sum of Byte0 and Byte1 among received data are same, Radio would send ACK data and execute command. If not, Radio sends Nack data.
User would go into next step if receives ACK data. If user receives Nack data, user should send command again.

example) If user changes from 1^{st} Channel to 2^{nd} Channel,
User should send Channel Change Command (0x64,0x02,) (0x64 + 0x2)) to Radio.
If Byte2 and sum of Byte0 and Byte1 among received data are same, Radio sends ACK data to user and changes to 2^{nd} channel. If not, Radio would send Nack data.

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Audible alert tones

Your SD-125E series data radio has a sophisticated microprocessor control which provides a range of audible tone. if you connect the Speaker filtered OUT (Pin 9 of DB-15 connector) to an external speaker, you can hear audible tones at the following conditions:

- Attempt to transmit on a channel that is already in use when busy channel lockout has been programmed into the radio
- Transmission time has exceeded time-out timer programmed length
- When the other group or people finished transmission using repeater

See the status audible alert tones chart for full details.

Status	Description	Audible tone
Warning	Busy Channel lockout	Single Beep Tone
	Before 5S T-O-T	Single Beep Tone
	Transmit Hang on time	Single Beep Tone

Accessories available

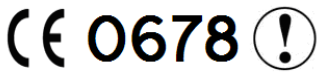
Please contact the Maxon sales team for accessory information.

sales@maxoncic.co.uk
Tel: + 44 (0) 1442 267 777

maxon cic EUROPE
Maxon House,
Cleveland Road,
Hemel Hempstead,
Hertfordshire,
United Kingdom,
HP2 7EY
Tel: + 44 (0) 1442 267 777
Fax: + 44 (0) 1442 215 515
www.maxoncic.co.uk

SD125E Series

This product is marked with



in accordance with the Class II product requirement specified in the R&TTE Directive 1999/5/EC.

This equipment is intended for use in:-

Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland & United Kingdom

and requires authorisation (individual licence) for use.

We hereby declare that the above named product is in conformity to all the essential requirements of Directive 1999/5/EC.

Con la presente si dichiara che il prodotto sopra menzionato è conforme ai requisiti essenziali della Direttiva 1999/5/CE.

Declaramos que el producto mencionado más arriba cumple todos los requisitos esenciales de la Directiva 1999/5/CE.

Wir möchten hiermit bekanntgeben, daß das oben genannte Produkt in Übereinstimmung mit allen erforderlichen Bedürfnissen der 1999/5/EC Direktive seht

Nous déclarons que le produit référencé ci-dessus satisfait aux exigences
R&TTE 1999/5/EC qui lui sont applicables.

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Maxon House,
Cleveland Road,
Hemel Hempstead,
Hertfordshire,
United Kingdom,
HP2 7EY
Tel: + 44 (0) 1442 267 777
Fax: + 44 (0) 1442 215 515
info@maxoncic.co.uk
www.maxoncic.co.uk